

determining some others of the following Observations.

## O B S. VI.

The Diameter of the sixth Ring at the most lucid part of its Orbit was  $\frac{58}{100}$  parts of an Inch, and the Diameter of the Sphere on which the double convex Object-Glass was ground was about 102 Feet, and hence I gathered the thickness of the Air or Aereal Interval of the Glasses at that Ring. But some time after, suspecting that in making this Observation I had not determined the Diameter of the Sphere with sufficient accurateness, and being uncertain whether the Plano-convex Glass was truly plain, and not something concave or convex on that side which I accounted plain; and whether I had not pressed the Glasses together, as I often did, to make them touch (for by pressing such Glasses together their parts easily yield inwards, and the Rings thereby become sensibly broader than they would be, did the Glasses keep their Figures) I repeated the Experiment, and found the Diameter of the sixth lucid Ring about  $\frac{55}{100}$  parts of an Inch. I repeated the Experiment also with such an Object-Glass of another Telescope as I had at hand. This was a double convex ground on both sides to one and the same Sphere, and its Focus was distant from it  $83\frac{1}{2}$  Inches. And thence, if the Sines of incidence and refraction of the bright yellow Light be assumed in proportion as 11 to 17, the Diameter of the Sphere to which the Glass was figured will by computation be found 182 Inches. This Glass I laid upon a flat one, so that the black

black Spot appeared in the middle of the Rings of Colours without any other pressure than that of the weight of the Glass. And now measuring the Diameter of the fifth dark Circle as accurately as I could, I found it the fifth part of an Inch precisely. This measure was taken with the points of a pair of Compasses on the upper surface on the upper Glass, and my Eye was about eight or nine Inches distance from the Glass, almost perpendicularly over it, and the Glass was  $\frac{1}{8}$  of an Inch thick, and thence it is easy to collect that the true Diameter of the Ring between the Glasses was greater than its measured Diameter above the Glasses in the proportion of 80 to 79 or thereabouts, and by consequence equal to  $\frac{16}{79}$  parts of an Inch, and its true Semi-diameter equal to  $\frac{8}{79}$  parts. Now as the Diameter of the Sphere (182 Inches) is to the Semi-diameter of this fifth dark Ring ( $\frac{8}{79}$  parts of an Inch) so is this Semi-diameter to the thickness of the Air at this fifth dark Ring; which is therefore  $\frac{32}{567931}$  or  $\frac{19}{1774534}$  parts of an Inch, and the fifth part thereof; viz. the  $\frac{1}{88727}$ th part of an Inch, is the thickness of the Air at the first of these dark Rings.

The same Experiment I repeated with another double convex Object-glass ground on both sides to one and the same Sphere. Its Focus was distant from it 168 $\frac{1}{2}$  Inches, and therefore the Diameter of that Sphere was 184 Inches. This Glass being laid upon the same plain Glass, the Diameter of the fifth of the dark Rings, when the black Spot in their center appeared plainly without pressing the Glasses, was by the measure of the Compasses upon the upper Glass  $\frac{11}{100}$  parts of an Inch, and by consequence between the Glasses it was  $\frac{1222}{6000}$ . For the upper Glass was  $\frac{1}{8}$  of an Inch thick, and

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